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to vary indirectly with the distance from the crown. Roots of French crab, so extensively used in America as stock, are less hardy than roots from scions of an average variety of apple. It is of considerable interest to note that heavy dormant pruning, thinning of fruit, and application of nitrate fertilizers prolonged the growth period, lengthened the rest period, and consequently reduced the early forcing of growth in spring with subsequent injury by late frosts. The selection of trees with long rest period also helps to obviate the latter injury. Of apple blossom tissue, the pollen was found most resistant to low temperature.

The work presented in this bulletin is of such a character as to be of great interest alike to those engaged in "pure" science and to those whose chief interest is in the applied side.—L. I. KNIGHT.

**Mitosis in *Tetraspora*.**—In the green alga *Tetraspora lubrica*, MCALLISTER<sup>6</sup> finds that mitosis, so far as can be made out from the very small nuclei, corresponds in its essential features with that in higher plants. In the cell which is to give rise to 8 gametes, the resting nucleus contains a reticulum with net knots and a nucleolus. During the prophase, the reticulum develops chromatic bodies which apparently become arranged in a row to form a spirem thread. The nucleolus takes no part in this process. The spirem segments to about 13 chromosomes, which divide and pass to opposite poles. Details of spindle-formation were not made out, but there was found no reason to believe that *Tetraspora* differs from higher plants in this respect. Centrosomes or centrospheres, which might be expected on account of their reported presence in the gamete-forming cells of certain bryophytes, were not found. Cell-division is brought about by the splitting of a granular cell plate formed by the central spindle. The splitting takes place from the center outward.

The second and third mitoses follow quickly, but in each case the daughter nuclei enter the resting stage. The single pyrenoid of the original cell remains unchanged through the three divisions, so that it comes to lie in only one of the 8 gamete cells. In each of the other 7 cells one appears to arise *de novo* from the cytoplasm. The entire pyrenoid is said to fragment to form several starch bodies.

Since *Tetraspora* and other green algae resemble higher plants so closely in mitosis and differ so widely from the Euglenidae, the theory that the Chlamydomonadaceae, to which *Tetraspora* is held to be so closely related, have arisen from the Euglenidae is believed by MCALLISTER to be excluded.—L. W. SHARP.

**Mitosis in *Preissia*.**—In many papers dealing with mitosis in liverworts, attention has been focused chiefly upon the centrosome and related structures.

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<sup>6</sup> MCALLISTER, F., Nuclear division in *Tetraspora lubrica*. Ann. Botany 27: 681-697. pl. 56. 1913.